Spring 2018

snowy hydro NEWS

In this edition:

- Reflecting on the past year - CEO, Paul Broad
- Designed to manage low storage levels
- Snowy 2.0 Update and Business Spotlight
- What is black start capability?

WE WELCOME YOUR FEEDBACK:

✉ communityfeedback@snowyhydro.com.au ☎ 1800 623 776

ISSUE 42

Reflecting on t

CEO Paul Broad reflects on the year that has been for Snowy Hydro and the opportunities and challenges that lie ahead...

Many people believe Snowy Hydro is special because of its history, and while I agree with them there is more to our business than just our pioneering past. Snowy Hydro is exceptional, not only because of its nation-building achievements, but because of what we do today and our plans for growth in the future.

There is no doubt that last financial year was successful for Snowy Hydro but it was not without its challenges. Energy and climate policy continues to be a topic of debate across national media, State and Federal Governments undertook wide-ranging reviews of the energy market and regulatory reforms were announced.

Closer to home, water inflows into the Snowy Scheme – the lifeblood of our business – were significantly below their historical averages (but are by no means at their lowest levels). The Snowy is not immune from the drought which is, regrettably, wreaking havoc on our nation's farmers, but we have strategically managed our water resources for more than half a century so it's something we're very good at. We've been out every week measuring the snow as we have for more than 60 years. So far we've had good snow and we are closely monitoring the snowpack. We hope that it results in good runoff into our storages into spring as the snow melts.

Years of low water inflows like these demonstrate the strategic value of previous decisions by Snowy management to acquire peaking gas and diesel plant so we have some diversity in our generation assets. These assets, located across the National Electricity Market, also help protect Snowy Hydro from risks should there be any transmission issues or outages with power lines around the Snowy Scheme.

Last year we transitioned to 100% Commonwealth ownership following the sale of New South Wales and Victoria's shares by their respective State Governments. While we have gone from three shareholders down to a sole shareholder, from an operations perspective it's very much 'business as usual' with our independent Board of Directors.

On a similar note, we have the appointment of a new Federal Energy Minister and we welcome Angus Taylor as our Shareholder Minister. Minister Taylor certainly is no stranger to the Snowy Scheme - his Grandfather, Sir William Hudson was the first Commissioner of the Scheme in 1949.

We continue to be very busy progressing Snowy 2.0 towards a final investment decision by our Snowy Hydro Board in December. You would have seen that we're proposing to undertake Exploratory Works in the Lobs Hole area ahead of


Guthega

he past year...

the main project. These works will give us a greater understanding of the underground geological conditions at the likely location of the Snowy 2.0 power station. Horizontal core samples will be taken at depth - adding to our knowledge gained from surface geological investigations - so we can confirm the precise location and design of the underground cavern.

Once again we have been out-and-about in the community seeking feedback on the project and we'd like to thank the local Chambers of Commerce for assisting us with the latest round of community engagement. While we're aware of a few concerns around some of the localised impacts of the Exploratory Works, on the whole we've been grateful for the support that we have received for this early stage of the project from locals. Snowy Hydro will do everything possible to minimise disruption to recreational areas, especially around Talbingo during the proposed Exploratory Works.

Snowy Hydro remains an active supporter of communities in the Snowy Mountains, and recently we have extended our focus of support to include employment, training and STEM - which is curriculum based on the idea of educating students in the four specific disciplines of science, technology, engineering and mathematics.

Recently I was at the launch of the NSW Police Citizens Youth Clubs (PCYC) program, RISEUP, of which Snowy Hydro is a founding corporate partner. The RISEUP program links with businesses so that young people receive real-life, on-the-job training in the workforce, and includes workshops on relationship-building, nutrition, leadership and assistance to tackle the underlying causes of crime.

Once again this year we've run our annual National Science Week competition across the Snowy Mountains Region. Through this competition and our other educational activities we hope to inspire our very own next generation of 'Snowy' STEM graduates. We have received some fantastic entries this year and our judging panel is currently going through them to choose the winner - a task that I do not envy!

To wrap up, it has been a successful year for Snowy Hydro but more opportunities and more challenges lay ahead. Of course, Snowy 2.0 won't progress itself and our unique assets don't manage themselves, which is where our talented and dedicated teams come in. Our success this year would not have been possible without the right people across our business and I thank everyone for their hard work.

As always, there is a lot happening across Snowy Hydro and we will keep the community up-to-date and informed as these events unfold.

Designed to manage low storage levels

With 100% of New South Wales now officially drought declared, Manager Weather & Water, James Pirozzi, gives a timely update on Snowy Scheme water storages...

The Snowy Mountains region experiences the same weather and climate patterns as the broader southeast Australian region.

Below average rainfall has fallen over southeast Australia in the last 18 months and 100% of NSW has recently been declared as drought affected.

While we have been lucky with above average snowfall in the mountains so far this winter, water reserves are getting low at Snowy. Our central storage of Lake Eucumbene is below 20% (as of August 2018) which is its lowest level since this time in 2010.

However, it is important to remember that Eucumbene is the Snowy Scheme's largest storage and plays in important role in regulating the highly variable inflows that the Scheme receives over multiple seasons and years. It rises and falls over much longer periods than many of our other reservoirs. Importantly, our storages are usually at their lowest coming into winter and we expect to see them rise when we get the spring runoff later this year.

Snowy Hydro constantly monitors inflows and weather forecasts to plan for current and future operations.

For more than 60 years we've successfully managed the Snowy Scheme through periods of high inflows and very severe droughts.

While we have a long term average output, we operate through cycles - we tend to generate more energy in years of tight supply and operate less (allowing for our storages to refill) in years when the market is oversupplied.

For example, we have generated more energy recently with Hazelwood retiring which has impacted on our overall storage levels.

Snowy Hydro owns a range of gas and diesel assets which are used to respond to market demands, to cover our contracted positions and respond to transmission outages.

Our existing pumped-hydro capability in Tumut 3 Power Station has been valuable in years of low inflows. Pumping enables us to 'reuse' available water within a closed system before the water is released as per the strict conditions of our water licence for use by downstream water users and for environmental flows.

Snowy 2.0 will operate as part of the existing Snowy Scheme. However, Snowy 2.0's pumping and generation capabilities are expected to be particularly valuable in dry conditions. Snowy 2.0 does not change the conditions of our existing water licence and will not have any impact on downstream water users or environmental flows.

Lake Eucumbene

SNOWY 2.0 UPDATE

Planning for a complex and very large project like Snowy 2.0, the proposed pumped-hydro expansion of the Snowy Scheme, requires thorough research, expert advice and technical skill...

The Snowy 2.0 team has been working hard to refine the project's design specifications in the lead-up to Snowy Hydro's final investment decision.

To help inform this process and add to the significant knowledge we have within the company, we have been seeking input from specialists within Australia and around the world.

Key team members have visited pumped-hydro and tunnelling projects in other countries and Snowy Hydro has hosted representatives from major construction projects on-site in the Snowy Mountains.

Information gained from this consultation, coupled with Snowy Hydro's vast experience managing and upgrading the Snowy Scheme, is also assisting with the contractor tender process currently underway. Snowy Hydro owns and oversees the 2.0 project, but we have issued tenders for the specialist civil and electrical and mechanical contractors we need to build it.

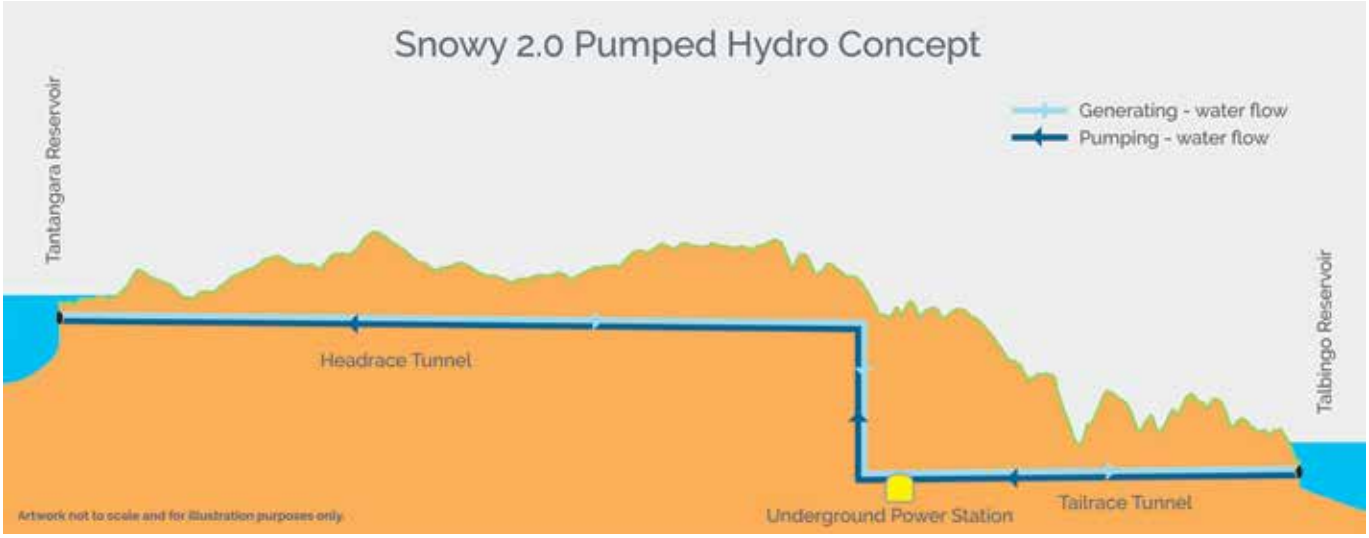
The tenders will address a wide range of project elements such as safety management - Snowy's number one priority - design methodology, logistics, procurement, human resources and community engagement.

We are engaged in in-depth liaison with the potential contractors so they have as much information as possible to develop and refine their tenders.

Snowy Hydro's independent Board of Directors will make a final investment decision on the Snowy 2.0 project by the end of 2018.

Should the board decide to proceed, environmental and planning approvals are required before any construction can get underway.

Earlier this year Snowy 2.0 was recognised as a Critical State Significant Infrastructure (CSSI) project by the NSW Minister for Planning. The CSSI declaration is very welcome but it's not an approval per se. It is a framework that sets out the robust environmental assessment and approval process required for the Snowy 2.0 project.



Exploratory Works Environmental Impact Statement

Snowy Hydro is currently seeking approval for a program of Snowy 2.0 Exploratory Works, which would provide a greater understanding of the underground geological conditions at the likely location of the new pumped-hydro power station.

While we have conducted geological investigations from the surface, we have not explored the rock in-situ, at depth. During Exploratory Works horizontal core samples would be taken at depth, allowing us to confirm the precise location and design of the underground cavern. As this is one of the most challenging aspects of the project, it is important to gain the additional geological data as soon as possible.

The works include excavation of a 3.1km exploratory tunnel to the proposed site of the power station cavern, establishment of a construction compound and supporting infrastructure, upgrade and establishment of access roads, excavated rock management and establishment of barge access infrastructure on Talbingo Reservoir.

Snowy Hydro has submitted an EIS for Exploratory Works. If approved, they are scheduled to begin in late 2018. For more information you can visit: snowyhydro.com.au/our-scheme/snowy20/

An EIS is also being prepared for the main project and is expected to be submitted early in 2019.

snowy 2.0 Business Spotlight

As Snowy 2.0 progresses to final investment decision (FID) late in 2018, Snowy Hydro expects opportunities for local business participation in the project to grow. Already there are economic benefits flowing through the region, with business owners reporting an increase in commercial activity.

Since the Snowy 2.0 project was announced early in 2017, it has been all systems go at Snowy Hydro completing the feasibility study, carrying out vital geotechnical investigations and refining design specifications.

From the start of the feasibility study and ongoing work ahead of a final investment decision, local businesses have been involved in Snowy 2.0 providing services throughout the mountains, including landscaping, haulage, surveying, civil works, helicopter, printing and drilling.

The early stages of Snowy 2.0 have also created indirect economic opportunities and activity for operators around the region in areas such as vehicle maintenance, machinery parts, printing, accommodation and hospitality.

Local businesses owners who have worked on the early stages of Snowy 2.0 say they're bringing in increased revenue and both their work levels and staffing have grown.

In addition to supplying services to the project directly, some have also been engaged by contractors working on Snowy 2.0.

Jindabyne Landscaping, which has provided access track upgrades, earthworks and vegetation management for the 2.0 drill sites, has been involved since July last year.

Owner Andrew Downing said the extra work - for both Snowy 2.0 directly and drilling contractor GHD - had generated eight new full-time and casual jobs.

"We have been very busy. This work has generated a significant increase in our income," Andrew said. "It has been a real boost to our business and I can only see a continuing spread of that commerce into the local economy, which is going to be massive."

Cooma surveyor Peter Burns has spent hours out in the field in all weather collecting data integral to the development of 2.0. His small business, Peter W. Burns Pty Ltd, has provided a variety of surveying services to both Snowy Hydro and other consultants engaged on the project.

"We have already been able to significantly increase our staff resources and technical capacities as a result of undertaking this work," Peter said.

very busy. This work has generated a significant increase in our income,"

Andrew Downing - Jindabyne Landscaping

In Tumut and Tumbarumba, businesses delivering site and environmental rehabilitation services have been consistently busy since Snowy 2.0 got underway.

Elizabeth MacPhee, whose Tumut-based company Alpine Flora has supplied environmental rehabilitation works and related planning services for Snowy 2,0, has been so busy she employed a subcontractor to fulfil other contracts.

Nigel Grant Contracting has performed work such as aeration of compacted soils, general site rehabilitation, and removal of temporary tracks and roads. "We bring these drilling sites back to life so in the coming months they are reclaimed by the surrounding bushland," Nigel said.

Should the project progress after FID, he believes there are benefits for whole communities. "I think there will be a need for specialist skills, but because this project is on such a big scale I think a lot of locals will be able to get a bite of the cake somewhere along the line either directly or indirectly."

Snowy 2.0 banners, booklets, newsletters and thousands of pages of technical documents including the project's feasibility study have been printed by Cooma business South East Printing.

Owner Brian Coyte says the Snowy 2.0 project has seen activity increase for his business. "This has put some icing on the cake over the last six months. As we primarily deal with other business people, I know from conversations I have had that Snowy 2.0 has already made a difference to our town and the confidence of local businesses."

If you run a local company and are interested in potential opportunities with Snowy 2.0, you can register your details with the Snowy 2.0 Business Directory at www.snowyhydro.com.au

Please note that while Snowy Hydro owns the project, a number of large civil, electrical and mechanical contractors will take the lead on the construction. These principal contractors will manage the project's procurement, specialist subcontracting and workforce requirements. An Australian Industry Participation Plan is being developed which will formally outline opportunities for Australian businesses.

"We have already been able to significantly increase our staff resources and technical capacities as a result of undertaking this work."

Peter Burns, Surveyor - Cooma

What is black start capability?

Ever wondered what happens behind the scenes in the electricity network when we experience a large blackout? The system needs to be restarted, and Snowy has the power to do it.

Black start, also referred to as System Restart Ancillary Service (SRAS), is the restart of an electricity grid after a total or partial shutdown. This is different to most outages people experience at home, which are caused by issues on the local network and don't affect the wider grid.

Most energy providers do not have the capacity to perform this function as some form of initial power is required to re-start their generators (like a battery is needed to start your car, however in this case so much power is needed you also need a jump start from another car). Large coal-fired power stations take a huge amount of energy to start up, whereas Snowy Hydro through the Snowy Scheme has energy stored in the water that feeds our turbines.

Our ability to provide reliable, flexible and fast-start power means we are a lead provider for black start services in the National Electricity Market (NEM). The Australian Energy Market Operator (AEMO) manages the NEM and is responsible for ensuring that the lights are kept on and that the power grid can be turned back on quickly in the event of a major outage.

Snowy Hydro has contracts with AEMO to provide SRAS for NSW and Victoria. In NSW we use Tumut 1,Tumut 2 and Tumut 3 power stations in the Scheme, as well as our gas-fired Colongra Power Station located on the Central Coast of NSW. Murray 1 and Murray 2 power stations located at Khancoban are the stations used for a black start in Victoria.

Our position is further strengthened by the fact that our power stations are geographically spread out, which means we can restart numerous parts of the grid and provide redundancy to aid the speed of restart.

From an operational perspective, the team in our Snowy Mountains Control Centre in Cooma (the central operating hub of all Snowy Hydro assets) need to maintain black start training and ensure our plant reliability.

What this also means is that Snowy Hydro has an obligation to have a minimum number of units available at all times in order to provide enough generation to re-energise the grid. This availability is factored into our outage and maintenance programs and is a consideration when scheduling such work on our plant.

The black start function is good for our business but it also highlights the importance of hydro and reliable backup systems in the NEM.

In 2016 a series of incidents brought down the SA electricity grid and further additional failed restarts left the state (except for Kangaroo Island) without power for three hours. Many households and businesses had to wait days for electricity services to be restored.

Colongra Power Station

The cost of the disaster was estimated at $367 million to businesses, with obvious social impacts. This example highlights the importance of ensuring a reliable and effective blackstart provider is available at all times.

A new Murray 1 runner

Refurbishment continues at M1

In 2016 we commenced refurbishment works at our Murray 1 Power Station near Khancoban. Manager Plant Engineering, Trevor Hammersley, gives an update on the works...

At Snowy Hydro we maintain our plant to the highest standards to ensure we are not only able to meet our contract position, but also to meet the needs of the National Electricity Market. As parts of the Snowy Scheme have been operating for more than 60 years, it is critically important that we modernise the Scheme assets through replacing ageing technology to maintain long term reliable operational capability.

Refurbishment works started in 2016 at Murray 1 Power Station, with Unit 4 being the first generating unit in the station to be refurbished - while also having its controls and protection systems upgraded. Since then, controls upgrades to Unit 1 and 2 have also been completed and Unit 1 is expected to return to service after refurbishment in time for 2018 seasonal snow melt.

With the return to service of these units, the controls upgrades program at Murray 1 Power Station will be complete. The new controls equipment brings greater functionality, more readily available spares within the market, and the introduction of new instrumentation to some parts of the machine that has allowed us to better understand the operation of the plant; allowing us to better target maintenance activities and their timing.

Unfortunately the planned mechanical refurbishments at Murray 1 have encountered some delays and we are currently working through some teething issues with new turbine runners. Snowy Hydro has committed a significant investment of time and resources to address these issues and we hope to be able to develop a revised plan for the refurbishment of the station late this year.

There is a large investment commitment in 2019 for some technology upgrades in the form of Control and Protection systems which are scheduled at both Murray 2 and Tumut 2 power stations to prepare the stations for improved response, monitoring and excitation as we prepare for a shifting energy market. We continue to invest in our plant in order to provide long-term reliability and 'keep the lights on'.

Tumut Pond Dam


SeaBotix ROV

Inspecting our underwater assets

As a number of our assets are located under water, inspections of these assets can be challenging. Civil Asset Engineer, John Dunne, explains how technology is helping...

We like to be at the forefront of technology and today Snowy Hydro is using remotely operated vehicles (ROVs) to better maintain our assets and keep our stations running reliably into the future.

We complete ROV inspections of locations such as dam walls, power station intakes and tunnel outlets to name a few. It is a safe and cost-effective way to visually assess underwater structures. Without using an ROV we either have to drain the reservoirs to expose these structures, or use divers to inspect them, which then puts people at risk diving in poor visibility and very cold water.

The ROV is just like a mini submarine attached to a cable. An operator is located on land who drives the ROV remotely and who can view the imagery captured from the ROV on screen and in real time. This means we are able to get good quality footage of underwater assets at an affordable cost, safely.

Just prior to winter we did an inspection of the Tumut 1 Power Station intake structure and the river outlet gates, both located underwater at Tumut Pond Dam. For this inspection we used a relatively small model ROV called a SeaBotix, which is about the size of a small suitcase. It records high quality video footage, measures depth, water temperature and has various navigation functions. It can have different cameras attached, Sonar, GPS and a grabbing claw. It is powered directly through its control cable so it can remain submerged for as long as required, and it can dive up to 150m deep.

The benefit of using the ROVs is that it eliminates safety risks of having people scubadive to physically inspect these assets, entering water from steep terrain and in temperatures that are too cold. We also don't have to have to take some assets out of service to complete the inspections.

At the end of the day we get access to full and recorded visuals of the state of our underwater assets to determine what work needs to be done on these assets to keep them in the best condition for our operations.

Some of the team at the Discovery Centre

Discover our Discovery Centre

Our Snowy Hydro Discovery Centre in Cooma continues to evolve and there is more to come! Team leader, Stephanie Hann, outlines what has been happening...

The Snowy Hydro Discovery Centre in Cooma is the largest of our three visitor centres across the Snowy Mountains region. Our visitor centres (also located in Khancoban and Cabramurra) are the hub of connecting our Snowy Hydro community to the broader community and beyond.

With our centre here in Cooma being a major attraction for those visiting the region, as well all the interest and excitement around Snowy 2.0, or people wanting to know more about our successful retailer Red Energy, we are seeing an increase in visitation to our centres.

Our visitors come from diverse regions - just like the original workers of the Snowy Scheme. We have recently welcomed visitors from as far as Nepal and Norway and a little closer to home from Hobart and Broome. They include tourists, engineers, school students, university students as well as our local community. Recent visits have included ANU Rural medical students and a group of graduate engineers from the Netherlands, who were full of questions about the engineering aspect of our business and Snowy 2.0.

The last three months have seen more than 7,500 visitors through the Discovery Centre and almost 3,000 students.

To cater for the increase in visitors our team has been busy working on updating the various parts of what we do every day. We have:

- been building a new education program to cater for the increased focus on STEM (Science, Technology, Engineering and Maths),
- invested in a great new coffee machine and range of food for our cafe,
- trialled opening from 6am to 4pm on winter weekends,
- employed wonderful new casual staff from our community,
- been reviewing and revisioning our lines of merchandise (lots of sale stock!); and
- been working on reducing waste across all our facilities.

The best news is that we are working towards upgrades to our Discovery Centre that will incorporate more digital content to educate and enlighten all our visitors.

So come and visit the Discovery Centre in Cooma! Wander through our centre, check out the range of goods we have on sale, ask our excellent customer service team for more information about Snowy 2.0 and the Scheme. Don't forget you can sign up for Red Energy too!

DISCOVER
THE
Snowy Scheme

A visit to the Snowy Mountains Scheme is a must for those wanting to experience the best of the region. Snowy Hydro owns and operates the Snowy Scheme and provides a range of facilities around the Snowy Mountains for people to see and experience the Scheme.

Snowy Hydro Discovery Centre Coffee Shop and Scheme Display
Monaro Highway, Cooma

OPEN 7 DAYS

8AM - 5PM Mon to Fri
(Winter hours) 6AM - 4PM Sat, Sun and Public Holidays

CLOSED

Christmas Day and Anzac Day

1800 623 776

snowyhydro.com.au

snowyhydro
renewable energy

Red Energy.
Proudly owned by Snowy Hydro.
That's real Aussie energy.

Owned by snowy hydro | *100% Australian Electricity & Gas*
redenergy.com.au

131 806

red energy™